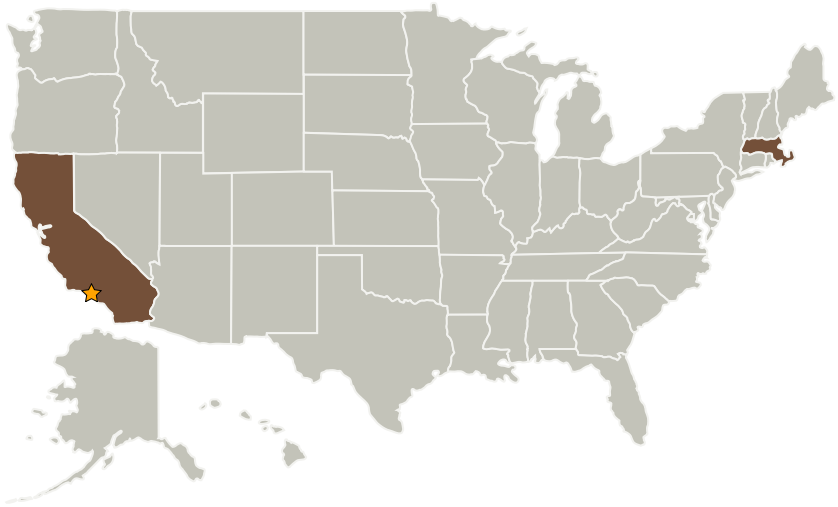
Adaptive Supervisory Engine for Autonomous Formation Flying GNC, Phase I

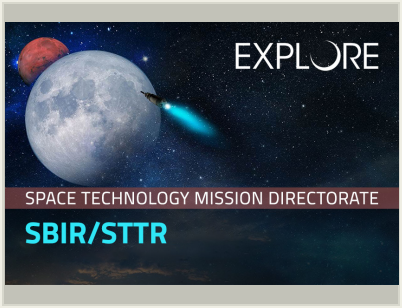
Completed Technology Project (2004 - 2004)

Project Introduction

Autonomous multiple spacecraft formation flying represents a critical enabling technology for future space missions, including NASA's Space and Earth Science Enterprises. The overall goal of this effort is to develop a general-purpose, onboard Autonomous Multi-spacecraft Supervisory Engine (AMSE) for guidance, navigation and control (GNC) functions, suitable for a wide range of formation flying and distributed, multi-spacecraft missions. It will be developed using the concepts of Intelligent Systems and Hybrid Model Predictive Optimization. The proposed approach will use systematic methodologies for formation modeling, optimal resource allocation and task/activity sequencing and control. During the proposed effort, SSCI will develop and demonstrate an AMSE system for selected multiple-spacecraft formation-flying tasks, using representative constraints for onboard and formation resources. AMSE technology will provide a general framework for implementation of onboard autonomy for future multiple spacecraft missions, which is both resource and constraint-aware. The AMSE design is most relevant to distributed S/C Formation Flying missions (such as Terrestrial Planet Finder), although the concepts and technology are generically applicable to all autonomous S/C systems.

Primary U.S. Work Locations and Key Partners





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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Scientific Systems Company, Inc.	Supporting Organization	Industry Small Disadvantaged Business (SDB)	Woburn, Massachusetts

Primary U.S. Work Locations	
California	Massachusetts

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Sanjeev Seereeram

Technology Areas

Primary:

- TX02 Flight Computing and Avionics
  - TX02.1 Avionics Component Technologies
    - TX02.1.3 High Performance Processors